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ASK NOT WHAT'S INSIDE THE HEAD, BUT WHAT THE HEAD'S INSIDE OF

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Under the influence of behaviorism, much of comparative psychology became what could be characterized as "animal psychology." Evolution theory was not taken seriously enough, and "Cardboard Darwinism" passed for serious theoretical discussion. Evolution was believed to be the result of selective, environmental forces that act upon passive organisms. Under the influence of reductionism, the comparative psychology of the brain became what could be characterized as "the psychology of the hypothalamus." Again, evolution theory was understood simplistically, as a gradual, incremental process—a matter of degree.

The article by Prato Previde, Colombetti, Poli and Spada is part of a trend away from behaviorism and reductionism, toward a cognitive approach. The authors mention two related benefits of this trend: The introduction of a cognitive approach into comparative psychology would result in a fuller understanding of animals as active organisms with genuine reflective capacities; and, by the same token, the introduction of an evolutionary, or comparative, approach into the cognitive sciences would result in a more ecologically valid understanding of cognition—"which is still lacking"(Prato Previde et al., this issue). The authors assure us, though, that studying the reflective capacities of animals need not "imply a straightforward transfer to animals of models of human thought."

Unfortunately, I feel that there are still some serious concerns about the application of "cognitivism" to comparative psychology. My first concern is the impression that cognitivism is the only alternative to behaviorism. It isn't. Comparative psychologists interested in Integrative Levels Theory (Tobach & Greenberg, 1984), Activity Theory (Tolman,

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1987) and the Ecological Approach (Gibson, 1979; Gottlieb, 1985) have all provided similar approaches that avoid the problems of both behaviorism and mentalism. By not mentioning these other approaches, Prato Previde et al. give the impression, perhaps unintentionally, that cognitivism is the only alternative.

My second concern is more serious, and stems from problems with cognitivism itself. Cognitivism attempts to explain the activity of organisms on the basis of cognitive processes, i.e., solely on the basis of what is "in the head." But, by restricting the object of study to what is "in the head," the cognitive approach lacks ecological validity. Incidentally, I do not see any serious consideration of evolution theory in the cognitive approach either. How can an approach so seriously lacking in ecological validity be applied to comparative psychology? Without modification, without "ecologizing," the application of cognitivism to the study of animals may be inappropriate. Hopefully, through the process of application itself, cognitive psychology will become more ecological. But the authors give only a vague, almost token reference to this problem; they do not seem to realize the risk that an ecologically void methodology may actually distort our understanding of animal behavior.

My final concern, which follows from the second, is the one that concerns me the most. The cognitive method, I fear, does indeed distort! The whole method and aim of cognitivism, i.e., to seek out mental representations, functions as an *a priori* assumption that tends toward anthropomorphism: In order to apply the cognitive method to the study of animals, one must already assume that animals share basic cognitive processes with humans. In fact, if the whole aim of cognitive psychology is to explain behavior in terms of what is inside the head (i.e., hypothetical "cognitive states and processes"), then cognitive psychology cannot explain anything unless these states and processes really exist. Hence, by asserting that cognitivism can be used, one is asserting, *a priori*, that all animals, including insects, possess cognitive states and processes.

Of course, organisms are able to reflect their environment, and the psyche has evolved through various levels. But this in no way implies that the psyche is solely "in the head," nor that an explanation in terms of mental states is always the best one. My main concern, here, is that there is an opposition to Morgan's cannon inherent in the cognitivist methodology. Cognitive psychologists are more prone to construct some hypothetical cognitive process (e.g., cognitive maps) than to look for some ecological explanation (e.g., the available, biologically-relevant information). Prato Previde et al. warn that explanations in terms of mental states should not be *post hoc* re-constructions; my warning is that these same explanations should not be *a priori* pre-constructions!

One can see the effect of the *a priori* assumption in the way cognitivists tend to interpret results. They assume, before all else, that some mental

process can explain the given result. Hence, when a bee fails to recruit other bees to fly over water, we are supposed to assume that they possess in their tiny heads (in their tiny ganglions) some sort of tiny cognitive map of the surrounding area. When bees are able to differentiate between two flowers whose vertical orientation changes, but are unable to differentiate when the flowers' horizontal orientation changes, we are supposed to assume the existence of one mental transformation ("vertical transformation") and the lack of another ("horizontal transformation"). I assume that this same method can be applied to the catfish that was accustomed to going around a barrier on its way to a food source (Leontyev, 1981). When the barrier was removed, the catfish persisted to detour around the, now nonexistent, barrier. Are we to explain this behavior by assuming that the catfish "mentally represented" the barrier in its absence? If so, then we should also conclude that dogs, which go directly toward the food once the barrier is removed, are not privileged with this mental capacity! When one sets out to look for mental processes (and restricts one's object of study to mental processes) then one is setting oneself up to be fooled. Attempts to explain these phenomena in terms of "neural networks" does not help any, for this is even more restricted to what is solely "in the head."

My concerns are directed more toward the whole cognitive approach than toward Prato Previde, Colombetti, Poli, and Spada. It is a "wholesale" application of cognitivism, fallacies and all, that I fear the most. Instead, we should learn from the mistakes of cognitivism—not apply them.

The title of my commentary is taken from William Mace's (1977) essay on the ecological approach. Its advice is wise, for what exists in the head of organisms evolved as a reflection of the environment and of the organisms' activity within that environment. Indeed, it is impossible to study what is in the head, without studying what the head is inside of. But I will have to leave it to those theorists interested in the ecological approach, activity theory, and integrative levels theory to explain it themselves. It is their research that provides a truly alternative approach to behaviorism and mentalism.

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